

have obliterated the continuity of this range (as appears to be the case), and consequently be newer in age. On tracing carefully the direction of one of the north rays of *Copernicus* we find it to bifurcate near the *south patch*, and one of the branches to touch and become lost in or under it. There are often great niceties in judging of the effects of these rays, and inferences must be drawn cautiously, but, on the whole, I think that this branch underlies without ridging the patch. The connection of the raised parts with the branching and curvilinear elevations being already hypothetically accounted for, it would then follow that the ray is older than the south patch. Lastly, as to the remaining question of the relative ages of the *Apennine* range and *Eratosthenes*, I should consider this Ringgebirg as last formed, because its circular shape gives evident proof that nothing has interfered with its form since its upheaval, while the *Apennine* range seems to have been clearly interrupted by *Eratosthenes*. Hence, I infer the relative ages of these localities and districts to stand thus in a descending series (beginning with the newest), *Autolycus*, *Archimedes* (and perhaps the hill ranges on the south patch), *north and south patches*, *Copernicus*, *Eratosthenes*, *Apennine* range, *Mare Imbrium*.

Enleigh Observatory, Lansdowne, Bath,
27 Sept. 1869.

On his new Observatory at Churt, Surrey.
By R. C. Carrington, F.R.S.

I have bought the freehold of almost nineteen acres of land situated six miles to the south of Fareham, on a part of Frensham Common, in the village of Churt. It contains a conical hill, sixty feet high, which is entirely detached, and it was this that induced me to purchase it. It goes by the name of The Middle Devil's Jump, as in another spot near by there is the Devil's Punch-Bowl. Its situation by the Ordnance Survey is

Lat. $51^{\circ} 8' 49''$ N.

Long. $0^{\text{h}} 3^{\text{m}} 1^{\text{s}}.7$ West of Greenwich.

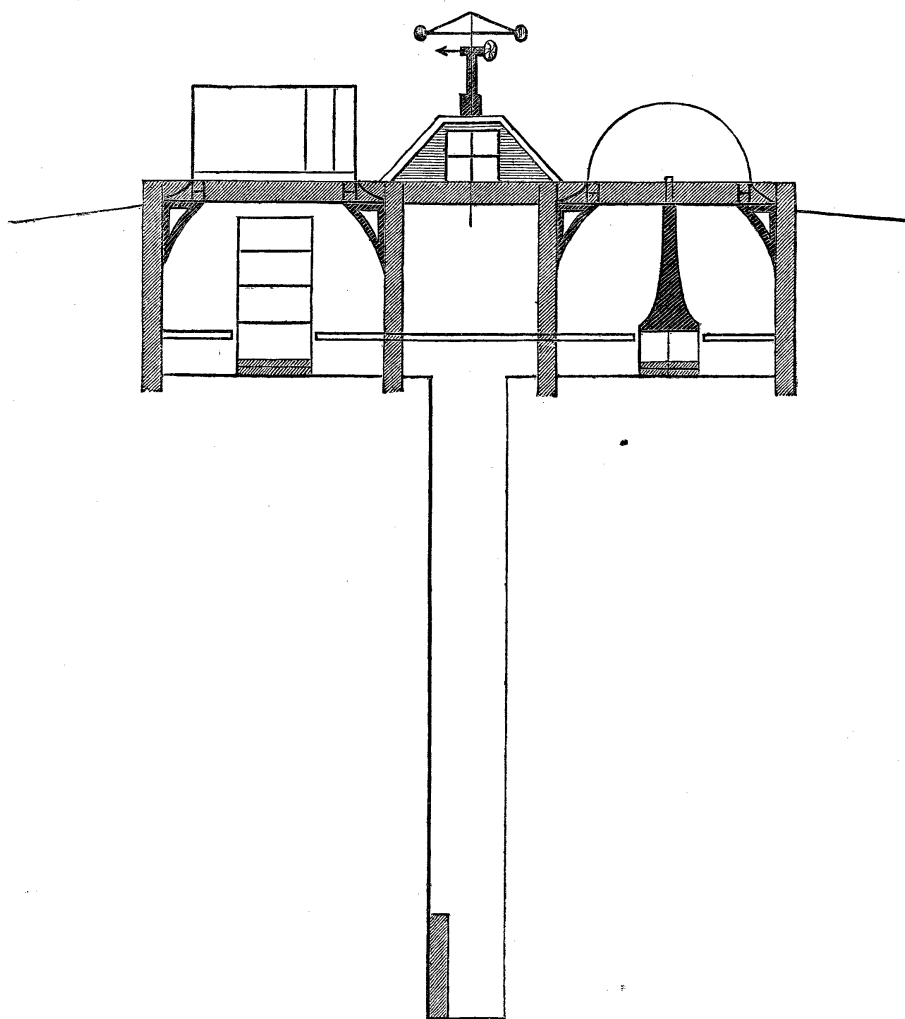
Alt. about 340 feet above Liverpool.

Farnham is the nearest post-town and railway-station. It is necessary to state this, as I find letters and parcels continue to be addressed to me at Redhill, though I have left it seven years ago.

There are three things I wish to speak of, the Observatory in itself, the clock, and the principal instrument.

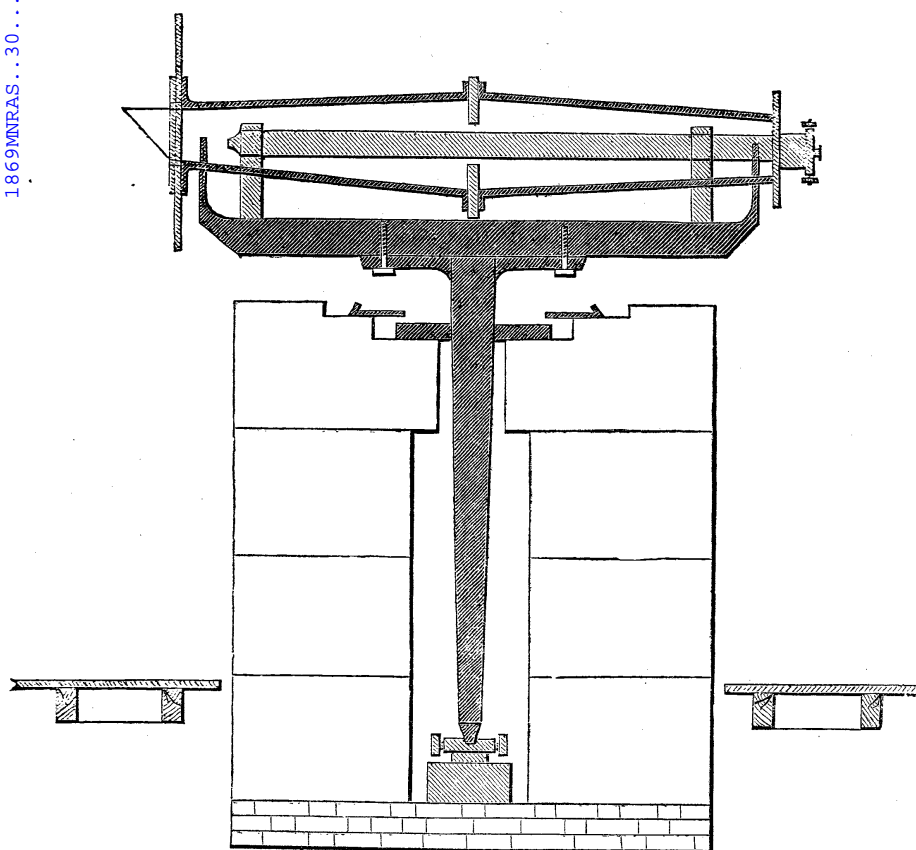
Being on a hill I did not want elevation, so I have sunk the

Observatory below ground, just peeping out over the soil. But I have further sunk a dry well, six feet in diameter, to the depth of forty feet from the centre of the Observatory, and with a horizontal shaft communicating with the south side of the hill, 166 feet in length, closed with three doorways. This is principally intended for the clock, for I am determined that one clock at least shall be properly mounted, at a position of invariable temperature and in an air-tight case. I propose to reduce the pressure to twenty-seven inches of mercury. My model clock is at present the one at Bidstone Observatory, made by the late

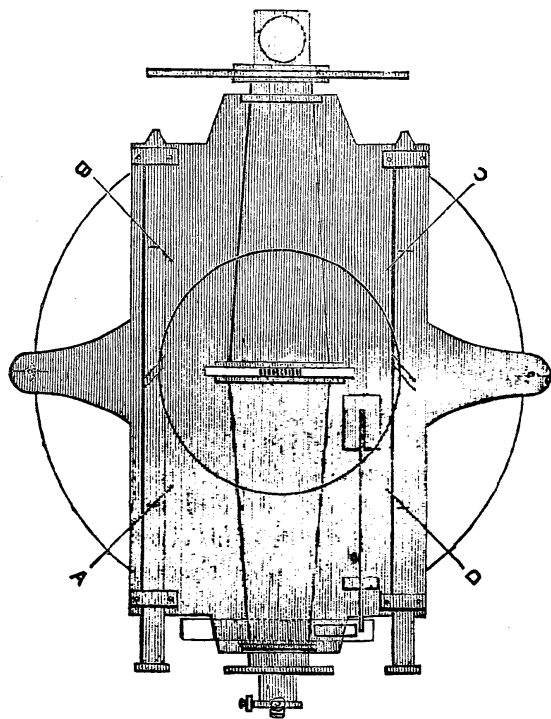


Observatory.

Mr. Richard Bond, with a gravity escapement, and its rates vary not more than $0^s.04$ per diem in November and December. Still Mr. Frodsham, to whom I applied, assured me that, provided I had a good pendulum, he did not care what the escapement was, and I have reluctantly gone back to the old dead beat. The communication with the moveable dial above is by galvanic



Altazimuth. Dark shade steel or cast-iron, light brass or gun-metal.



Altazimuth viewed from above. Scale $\frac{1}{10}$.

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wires, and all difficulty about hearing is overcome. I hope I shall shortly have the most perfect clock in England, perhaps in the world.

Of the principal instrument I have to announce that I have decided on having an altazimuth, but constructed on a new principle. I have fixed on Steinheil's principle of making the horizontal axis the effective optical axis, by placing the object-glass at one end, and the eye-piece at the other, with a prism outside the object-glass. The casting of the prism took over three months, but Messrs. Chance succeeded at last; six inches aperture is adopted, and six feet three inches focal length. It is some comfort to think that never need the telescope be raised, only turned round, and the observer always under cover. The principal vertical axis is steel, and the bed-plate of cast-iron. The telescope-tube is also cast-iron. The circles are both of thirty inches diameter; the altitude-circle of gun-metal solid throughout, that is without spokes, and cut out from a much larger piece. The microscopes are of five feet focal length, and I hope to try photography with them.

On certain important conclusions deducible from the Observations made on the Transit of Mercury at Greenwich, on November 5th, 1868. By Richard A. Proctor, B.A.

From a careful study of the investigations to which the observations made on the transit of *Venus* in 1769 have been subjected, and more especially of the masterly researches of Mr. Stone in the *Notices* for October 1868, I came long since to the conclusion that one of the chief points to be considered by astronomers in preparing for the coming transits is the effect which has been termed the "clinging of the limbs of the Sun and planet" near the time of true internal contact. In an article which appeared in the *Daily News* of November 4, 1868, I called special attention to the advantages which might result to science if observations were made on the internal contact of *Mercury* with reference to this effect. I wrote as follows: "Though transits of *Mercury* are not in themselves very important phenomena, it cannot be doubted that astronomers will avail themselves of the opportunity to practise, so to speak, for the approaching and far more important transits of *Venus* in 1874 and 1882. They will inquire whether the magnifying power of the telescope made use of has any bearing upon the duration of the deceptive appearance, or whether darkening glasses somewhat more powerful than those usually employed may not diminish the irradiation to which the phenomenon is due." A week later I wrote a letter to the same effect to the editor of the *Scientific Opinion*, and in a paper which appeared in that journal yet a week later (but was